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(71)出願人　591003493
キャリア　コーポレイション
ＣＡＲＲＩＥＲ　ＣＯＲＰＯＲＡＴＩＯＮ
アメリカ合衆国，ニューヨーク，シラキューズ，ピー．オウ．ボックス　4800，キャリア　パークウェイ　（番地なし）

(72)発明者　エドワード　エイ．ヒュエニガー
アメリカ合衆国，ニューヨーク，リヴァプール，アロウヘッド　レーン　4015

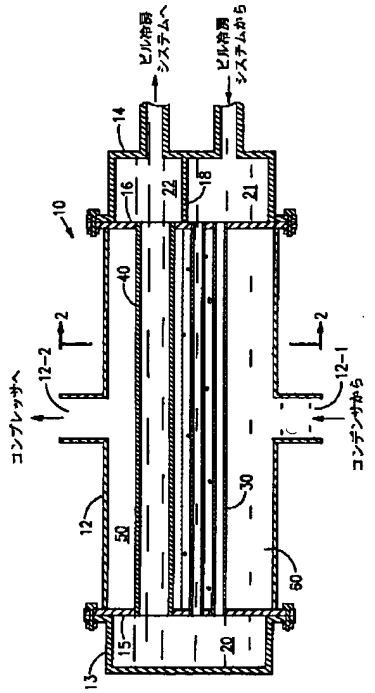
(74)代理人　弁理士　志賀　富士弥　（外２名）

(54)【発明の名称】　熱交換器

(57)【要約】

【課題】　水側の圧力損失およびポンプの動力を犠牲にすることなく、熱伝達チューブの数をかなり減少できるようにする。

【解決手段】　二路式熱交換器（１０）が提供される。第１の通路は、液状冷媒内に位置する複数のチューブ（３０）を含み、蒸発器として用いられる場合は、液体冷媒はチューブを流れる水から熱を引き出して水を冷却し、液体冷媒は蒸発する。第２の通路は、液状冷媒内に位置する必要のない単一のパイプ（４０）である。この二路式熱交換器は凝縮器としても使用可能である。



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【特許請求の範囲】

【請求項1】　シェル（12）と、前記シェルを密閉する一対の端部部材（13、14）と、

前記一対の端部部材の一方の第1の端部部材（13）と共働して中間水缶（20）を画定する第1のチューブシート（15）と、

前記一対の端部部材のもう一方の第2の端部部材（14）と仕切プレート（18）と共働して入口水缶（21）と出口水缶（22）とを画定する第2のチューブシート（16）とを有し、

前記第1および第2のチューブシートは、前記シェルと共働してチャンバ（50）を画定し、

更に、前記入口水缶から前記チャンバを経由して前記中間水缶へ延在する複数の伝熱チューブ（30）を含む第1の通路と、

前記中間水缶から前記チャンバを経由して前記出口水缶へ延在する単一の大径パイプ（40）により画定された第2の通路とを有し、

これにより、前記入口水缶、前記第1の通路、前記中間水缶、前記第2の通路、及び前記出口水缶によって、冷却回路が直列に画定されることを特徴とする熱交換器（10）。

【請求項2】　前記チャンバには液状冷媒（60）があり、前記第1の通路は、前記液状冷媒に浸っていることを特徴とする請求項1の熱交換器。

【請求項3】　前記第2の通路は、前記液体冷媒より上に位置することを特徴とする請求項1の熱交換器。

【請求項4】　前記シェルは略円筒状であって水平に配置され、

第1のポート（12－1）は、前記シェルの底部に位置し、前記チャンバと連通しており、

第2のポート（12－2）は、前記シェルの頂部に位置し、前記チャンバと連通していることを特徴とする請求項1の熱交換器。

【請求項5】　前記第1のポートは液体の流入ポートであり、熱交換器は蒸発器であることを特徴とする請求項4の熱交換器。

【請求項6】　前記第1のポートは液体の流出ポートであり、熱交換器は凝縮器であることを特徴とする請求項4の熱交換器。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、熱交換器に関し、特に水側の圧力損失およびポンプの動力を犠牲にすることなく、熱伝達チューブの数を相当削減した熱交換器に関する。

【0002】

【従来の技術】シェル側の冷媒と熱伝達関係にある複数のチューブを水が流れる種類のシェルおよびチューブタイプの熱交換器、即ち管形熱交換器は、少なくともひと

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つの圧縮機や他の構成要素を伴って水冷却装置組立体を形成する蒸発器および凝縮器として頻繁に用いられる。組立体においてひとつの構成要素の変更は他の構成に影響を及ぼす。たとえば、蒸発器が圧縮機や凝縮器の支持体となっていると、蒸発器の形状の変更は、圧縮機等にも影響を与える。

【0003】チラーの設計における他の一般的制約は、すべての水管（water box）の接続が熱交換器のシェルの一端に配置できるように水側に偶数本の流路を有することである。これにより水管接続を妨げることなく他端からチューブのクリーニングおよび手入れが行えるようになる。

【0004】

【発明が解決しようとする課題】所与の熱および圧力損失要件を満たしつつ熱交換器のサイズを小さくしたいが、このような交換器のサイズの縮小はチラーのさまざまな構成要素間の関係により不可能である、という場合がある。例えば、所望の性能特性に適合させるために、クーラーのシェルを長くしてかつ凝縮器のシェルを短くすることが望まれるが、チラー組立体としては双方を両立させることはできず、妥協せざるを得ない場合がある。

【0005】本発明の目的は、水側の圧力損失およびポンプの動力を犠牲にすることなく、熱伝達チューブの数をかなり減少できるようにすることである。

【0006】本発明の別の目的は、熱交換器の水側の全圧力損失における増加を伴うことなく水側の速度を比較的高く維持することにより高性能化した伝熱チューブをコスト的に有効に使用することである。

【0007】本発明のさらに他の目的は、他のチラー構成要素の設計を犠牲とすることなく水冷却装置の使用に適した熱交換器を許容することである。

【0008】本発明のさらに他の目的は、冷却システムにおける冷媒の充填量を減らすことである。

【0009】

【課題を解決するための手段】熱交換器を小さくするという要求は、基本的に一つの通路で必要とされるすべての熱伝達が行える二路式設計を提供することにより解決される。この一つの通路には、所望の直径、並びに、所望の熱伝達の表面特性および圧力損失を有するチューブを用いる。一方、第2もしくは戻り通路は、一本の大きな径のチューブもしくはパイプを用いる。特に、シェルおよびチューブタイプの二路式熱交換器の第2の通路は、複数のチューブを用いた通常の構成に代えて、（返送管としての機能を有する）一本のパイプを有する。

【0010】これにより、必ずしも非常に高い熱伝達性能が必要ではない場合、通常生じる水側の圧力損失の増加を伴うことなく、熱交換チューブ全体の数を大幅に減らすことができる。加えて、この構成により、熱伝達表面の効果的使用のために第1の通路のチューブにおいて

水側の速度を比較的高く保持できる。蒸発器において、第2の通路は、熱伝達表面積が限られていることから熱交換性能が低いので、液状冷媒内に配置する必要はない。このため、冷媒の液位を低くでき、よってシステムの冷媒の使用量を少なくすることができる。

【0011】これらおよび以下で明らかとされる他の本発明の目的は、本発明により達成される。

【0012】基本的に、二路式熱交換器は、主に戻り流路として機能する単一のパイプである第2の通路を有することにより、一路式熱交換器との代わりに用いることができる。この熱交換器は、蒸発器または凝縮器のどちらにも使用できる。

【0013】

【発明の実施の形態】図中、符号10は、シェルおよびチューブタイプ、即ち管形の二路式熱交換器全体を示す。この熱交換器10は、蒸発器として図示されたが、凝縮器の場合も流路の接続が異なるだけでその構造は同一である。熱交換器10は、両端にそれぞれ端部部材13、14を持った略円筒状のシェル12を有する。端部部材13はチューブシート15とで中間水缶20を画定する。端部部材14は、チューブシート16および仕切プレート18とで入口水缶21および出口水缶22をそれぞれ画定する。熱交換器10は、入口水缶21から水缶20まで延在する第1通路熱交換器を有し、複数の小径の伝熱チューブ30を含む。一般的に、チューブ30は、熱交換効率を高めるように、その内部および／または外部が高性能化される。熱交換器10の第2通路熱交換器は、中間水缶20から出口水缶22まで延在する大きな径のパイプもしくはチューブ40である。

【0014】チューブ30およびパイプ40は、シェル12とチューブシート15および16とにより画定される略円筒状のチャンバ50に配置される。チャンバ50は、図示されたように蒸発器として作動する際には流入口となるポート12－1を経由して凝縮器（図示せず）から液状冷媒60を受ける。パイプ40は熱伝達には関係しないので、液状冷媒60の液位はチューブ30より上にありさえすればよく、パイプ40を覆う必要はない。パイプ40の熱伝達面積は、チューブ30全体と比較すると小さい。凝縮器として作動する際、ポート12－2は、気体状冷媒を受ける流入口となる。気体状冷媒は、チューブ30内の水と熱を交換することで凝縮し、液化され、液状冷媒は、流出口として機能するポート12－1を経由して引き出される。

【0015】蒸発器として作動される場合、液状冷媒60は、流入口となるポート12－1を経由して凝縮器（図示せず）からチャンバ50に供給され、そこで液状冷媒60を気化しつつ、チューブ30を流れる水から熱を奪い、これによって水を冷却する。気体状冷媒は、流出口となるポート12－2を経由してチャンバ50から圧縮機（図示せず）のサクションに通過する。冷却システム（図示せず）の閉ループの冷却回路からの水は、ビルの冷房システムから入口水缶21へ供給される。そして水は、液状冷媒60と熱交換関係にあるチューブ30を通過する。液状冷媒60は気化しつつ、水から熱を奪い、これによって水を冷却する。チューブ30により画定された第1通路において熱伝達は行われ、この際、パイプ40が液状冷媒60内にあるなしにかかわらず、パイプ40による熱伝達はわずかである。

【0016】パイプ40によって画定された第2の通路を通過する水は出口水缶22へ入る。そこからビルの冷房システムの閉ループの回路へ冷房のため流入する。

【0017】凝縮器として作動される場合、気体状冷媒はチャンバ50に供給され、そこでチューブ30を流れる水、及び、わずかではあるがパイプ40を流れる水への熱伝達により冷却され、凝縮（液化）される。凝縮された液状冷媒は、チャンバ50の底、通常チューブ30の位置より下に集まる。液状冷媒は、引き出されて蒸発器（図示せず）に供給される。

【図面の簡単な説明】

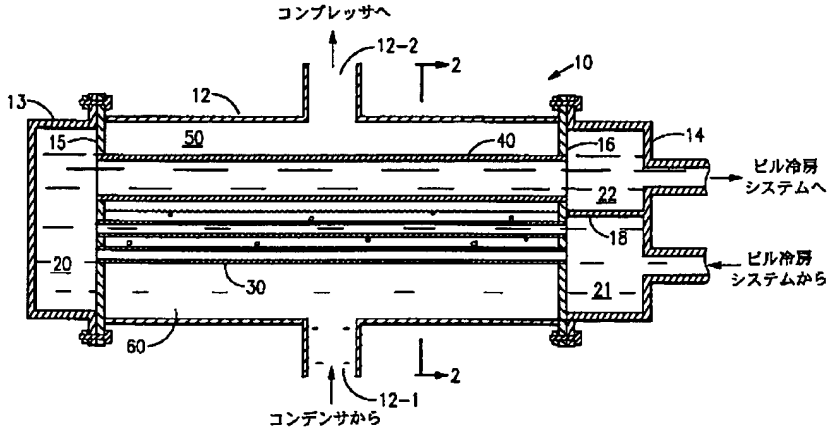
【図1】本発明に係る熱交換器の断面図である。

【図2】図1の線2－2に沿った断面図である。

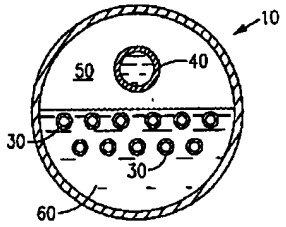
【符号の説明】

10…二路式熱交換器
13…端部部材
14…端部部材
15…チューブシート
16…チューブシート
18…仕切プレート
21…入口水缶
22…出口水缶
30…伝熱チューブ
40…パイプ
50…チャンバ
60…液状冷媒

【図１】


コンプレッサへ
12-2
2
10
13
12
15
50
40
16
14
ビル冷房
システムへ
22
18
ビル冷房
システムから
20
30
21
60
2
12-1
コンデンサから

【図２】


10
50
40
30
30
60

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TITLE: HEAT-EXCHANGER

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INVENTOR-INFORMATION:
NAME
HUENNIGER, EDWARD A

ASSIGNEE-INFORMATION:
NAME COUNTRY
CARRIER CORP N/A

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APPL-DATE: November 21, 1997

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ABSTRACT:

PROBLEM TO BE SOLVED: To reduce the number of heat transfer tubes as incurring of a pressure loss on the water side is suppressed by a method wherein a heat-exchanger comprises a first passage part using a small tube-diameter having a given diameter, given surface characteristics, and a pressure loss; and a second passage part using a single large-diameter tube or pipe.

SOLUTION: A heat-exchanger 10 is provided with an approximate cylindrical shell 12 provided at two end parts with end part members 13 and 14, an intermediate water drum 29 is partitioned by the end member 13 and a tube sheet 15, and an inlet water drum 21 and an outlet water drum 22, which are partitioned from each other by the end member 14, a tube sheet 16, and a partition plate 18. A portion ranging from the inlet water drum 21 to the intermediate water drum 20 forms a first passage heat-exchanger containing a plurality of small-diameter heat transfer tubes 30 and a portion ranging from the intermediate water drum 20 to be outlet water drum 22 forms a second passage heat- exchanger containing a large-diameter pipe 40. The tubes 30 and 40 are arranged in a chamber 50 approximately in a cylindrical shape, and the chamber 50 receives a liquid refrigerant through a port 12-1 when the heat-exchanger is functioned as a vaporizer.

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : CARRIER CORP

(72)Inventor : HUENNIGER EDWARD A

(30)Priority

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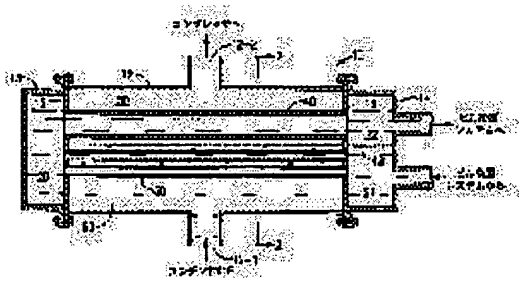
(54) HEAT-EXCHANGER

(57)Abstract:

PROBLEM TO BE SOLVED: To reduce the number of heat transfer tubes as incurring of a pressure loss on the water side is suppressed by a method wherein a heat-exchanger comprises a first passage part using a small tube-diameter having a given diameter, given surface characteristics, and a pressure loss; and a second passage part using a single large-diameter tube or pipe.



SOLUTION: A heat-exchanger 10 is provided with an approximate cylindrical shell 12 provided at two end parts with end part members 13 and 14, an intermediate water drum 29 is partitioned by the end member 13 and a tube sheet 15, and an inlet water drum 21 and an outlet water drum 22, which are partitioned from each other by the end member 14, a tube sheet 16, and a partition plate 18. A portion ranging from the inlet water drum 21 to the intermediate water drum 20 forms a first passage heat-exchanger containing a plurality of small-diameter heat transfer tubes 30 and a portion ranging from the intermediate water drum 20 to be outlet water drum 22 forms a second passage heat- exchanger containing a large-diameter pipe 40. The tubes 30 and 40 are arranged in a chamber 50 approximately in a cylindrical shape, and the chamber 50 receives a liquid refrigerant through a port

12-1 when the heat-exchanger is functioned as a vaporizer.

LEGAL STATUS

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[Date of sending the examiner's decision of rejection]	
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	3056151
[Date of registration]	14.04.2000
[Number of appeal against examiner's decision of rejection]	
[Date of requesting appeal against examiner's decision of rejection]	
[Date of extinction of right]	

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] Shell (12) and the edge member of the pair which seals said shell (13 14), The 1st tube seat which has two incomes with one 1st edge member (13) of the edge member of a Norikazu Saki pair, and demarcates a middle water can (20) (15), It has the 2nd tube seat (16) which has two incomes with another 2nd edge member (14) of the edge member of a Norikazu Saki pair, and a batch plate (18), and demarcates an inlet-port water can (21) and an outlet water can (22). The 1st path which said 1st and 2nd tube seats have two incomes with said shell, demarcate a chamber (50), and contains further two or more heat transfer tubes (30) which extend from said inlet-port water can to said middle water can via said chamber, It has the 2nd path demarcated with the single major-diameter pipe (40) which extends from said middle water can to said outlet water can via said chamber. By this The heat exchanger characterized by a cooling circuit being demarcated by the serial with said inlet-port water can, said 1st path, said middle water can, said 2nd path, and said outlet water can (10).
[Claim 2] It is the heat exchanger of claim 1 which there is a liquefied refrigerant (60) in said chamber, and is characterized by having flooded said 1st path with said liquefied refrigerant.
[Claim 3] Said 2nd path is the heat exchanger of claim 1 characterized by being located above said liquid cryogen.
[Claim 4] It is the heat exchanger of claim 1 characterized by being arranged horizontally [said shell is approximately cylindrical and], locating the 1st port (12-1) in the pars basilaris ossis occipitalis of said shell, being open for free passage with said chamber, locating the 2nd port (12-2) in the crowning of said shell, and being open for free passage with said chamber.
[Claim 5] It is the heat exchanger of claim 4 characterized by for said 1st port being an inflow port of a liquid, and a heat exchanger being an evaporator.
[Claim 6] It is the heat exchanger of claim 4 characterized by for said 1st port being an outflow port of a liquid, and a heat exchanger being a condenser.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Especially this invention relates to the heat exchanger which carried out considerable reduction of the number of heat transfer tubes, without sacrificing pressure loss by the side of water, and power of a pump about a heat exchanger.
[0002]
[Description of the Prior Art] The shell of the class in which water flows two or more tubes which have the refrigerant and heat transfer relation of a shellside, and a tube type heat exchanger, i.e., tubular type heat exchanger, are frequently used as the evaporator which forms a water cooling equipment assembly with at least one compressor or other components, and a condenser. In an assembly, modification of one component affects other configurations. For example, if the evaporator serves as a base material of a compressor or a condenser, modification of the configuration of an evaporator will affect a compressor etc.
[0003] Other general constraint in the design of a chiller is having even passage in a water side so that connection of all water pipes (water box) can arrange at the end of the shell of a heat exchanger. Cleaning and care and cleaning of a tube can be performed from the other end, without this barring water pipe connection.
[0004]
[Problem(s) to be Solved by the Invention] Although he wants to make size of a heat exchanger small, satisfying given heat and the requirements for pressure loss, contraction of the size of such an exchanger may be referred to as impossible with the relation between various components of a chiller. For example, although to lengthen shell of a cooler and to shorten shell of a condenser is desired in order to make desired performance characteristics suit, both sides are not reconciled as a chiller assembly and a compromise is reached.
[0005] The purpose of this invention is enabling it to decrease the number of heat transfer tubes considerably, without sacrificing pressure loss by the side of water, and power of a pump.
[0006] Another purpose of this invention is using the high-performance-ized heat transfer tube effectively in cost by maintaining the rate by the side of water comparatively highly, without being accompanied by the increment in the total pressure loss by the side of the water of a heat exchanger.
[0007] The purpose of further others of this invention is permitting the heat exchanger suitable for use of water cooling equipment, without sacrificing the design of other chiller components.
[0008] The purpose of further others of this invention is reducing the fill of the refrigerant in a cooling system.
[0009]
[Means for Solving the Problem] Demand of making a heat exchanger small is solved by offering the 2 way type design which can perform all heat transfers needed fundamentally at one path. The tube which has the desired surface characteristic and the pressure loss of heat transfer is used for a desired diameter and a list at this one path. On the other hand, the tube or pipe of one big path is used for the 2nd or a return path. Especially the 2nd path of shell and a tube type 2 way type heat exchanger is replaced with the usual configuration which used two or more tubes, and has one (it has a function as return tubing) pipe.
[0010] The number of the whole heat exchange tubes can be reduced sharply, without being accompanied by the increment in the pressure loss by the side of the usually produced water, when the thereby not necessarily very high heat transfer engine performance is not required. In addition, in the tube of the 1st path, the rate by the

side of water can be held comparatively highly by this configuration for the effective use on the front face of heat transfer. In an evaporator, since heat transfer surface area is restricted and the heat exchange engine performance is low, it is not necessary to arrange the 2nd path in a liquefied refrigerant. For this reason, liquid level of a refrigerant can be made low and, therefore, the amount of the refrigerant used of a system can be lessened.

[0011] The purpose of other this inventions clarified at these and the following is attained by this invention.

[0012] Fundamentally, a 2 way type heat exchanger can be straight used instead of a formula heat exchanger by having the 2nd path which is the single pipe which mainly functions as a return passage. This heat exchanger can be used for either an evaporator or a condenser.

[0013]

[Embodiment of the Invention] A sign 10 shows the whole 2 way type heat exchanger of shell and tube type, i.e., tubing, type among drawing. Although this heat exchanger 10 was illustrated as an evaporator, also in a condenser, that structure is [the heat exchanger] the same only by connection of passage differing. A heat exchanger 10 has the approximately cylindrical shell 12 which had the edge members 13 and 14 in both ends, respectively. The edge member 13 demarcates the middle water can 20 with a tube seat 15. The edge member 14 demarcates the inlet-port water can 21 and the outlet water can 22 on a tube seat 16 and the batch plate 18, respectively. A heat exchanger 10 has the 1st path heat exchanger in which the inlet-port water can 21 to the water can 20 extends, and contains the heat transfer tube 30 of two or more minor diameters. Generally, the interior and/or exterior are high-performance-ized so that a tube 30 may raise heat exchange effectiveness. The 2nd path heat exchanger of a heat exchanger 10 is the pipe or tube 40 of a big path with which the middle water can 20 to the outlet water can 22 extends.

[0014] A tube 30 and a pipe 40 are arranged at the approximately cylindrical chamber 50 demarcated with shell 12 and tube seats 15 and 16. As illustrated, in case a chamber 50 operates as an evaporator, it receives the liquefied refrigerant 60 from a condenser (not shown) via the port 12-1 used as input. Since a pipe 40 is not related to heat transfer, the liquid level of the liquefied refrigerant 60 does not have the wrap need in a pipe 40 that it must be above a tube 30. The heat transfer area of a pipe 40 is small as compared with the tube 30 whole. In case it operates as a condenser, a port 12-2 serves as input which receives a gas-like refrigerant. A gas-like refrigerant is condensed by exchanging the water and the heat in a tube 30, it is liquefied and a liquefied refrigerant is pulled out via the port 12-1 which functions as a tap hole.

[0015] When operating as an evaporator, a chamber 50 being supplied from a condenser (not shown) via the port 12-1 used as input, and evaporating the liquefied refrigerant 60 there, the liquefied refrigerant 60 takes heat from the water which flows a tube 30, and cools water by this. A gas-like refrigerant is passed from a chamber 50 to the suction of a compressor (not shown) via the port 12-2 used as a tap hole. The water from the cooling circuit of the closed loop of a cooling system (not shown) is supplied to the inlet-port water can 21 from the air conditioning system of a building. And water passes the liquefied refrigerant 60 and the tube 30 which has a heat exchange relation. Evaporating the liquefied refrigerant 60, it takes heat from water and cools water by this. At the 1st path demarcated with the tube 30, it is not concerned nothing but heat transfer by the pipe 40 in which heat transfer has a pipe 40 in the liquefied refrigerant 60 in a line crack and this case is slight.

[0016] The water which passes through the 2nd path demarcated with the pipe 40 goes into the outlet water can 22. It flows into the circuit of the closed loop of the air conditioning system of a building from there for air conditioning.

[0017] When operating as a condenser, a gas-like refrigerant is supplied to a chamber 50, and it is cooled by heat transfer to the water which flows a tube 30 there, and the water which flows a pipe 40 although it is small, and it is condensed (liquefaction). The condensed liquefied refrigerants gather below the location of the bottom of a chamber 50, and the usual tube 30. A liquefied refrigerant is pulled out and supplied to an evaporator (not shown).

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] Especially this invention relates to the heat exchanger which carried out considerable reduction of the number of heat transfer tubes, without sacrificing pressure loss by the side of water, and power of a pump about a heat exchanger.

[Translation done.]

PRIOR ART

[Description of the Prior Art] The shell of the class in which water flows two or more tubes which have the refrigerant and heat transfer relation of a shellside, and a tube type heat exchanger, i.e., tubular type heat exchanger, are frequently used as the evaporator which forms a water cooling equipment assembly with at least one compressor or other components, and a condenser. In an assembly, modification of one component affects other configurations. For example, if the evaporator serves as a base material of a compressor or a condenser, modification of the configuration of an evaporator will affect a compressor etc.
[0003] Other general constraint in the design of a chiller is having even passage in a water side so that connection of all water pipes (water box) can arrange at the end of the shell of a heat exchanger. Cleaning and care and cleaning of a tube can be performed from the other end, without this barring water pipe connection.

[Translation done.]

MEANS

[Means for Solving the Problem] Demand of making a heat exchanger small is solved by offering the 2 way type design which can perform all heat transfers needed fundamentally at one path. The tube which has the desired surface characteristic and the pressure loss of heat transfer is used for a desired diameter and a list at this one path. On the other hand, the tube or pipe of one big path is used for the 2nd or a return path. Especially the 2nd path of shell and a tube type 2 way type heat exchanger is replaced with the usual configuration which used two or more tubes, and has one (it has a function as return tubing) pipe.
[0010] The number of the whole heat exchange tubes can be reduced sharply, without being accompanied by the increment in the pressure loss by the side of the usually produced water, when the thereby not necessarily very high heat transfer engine performance is not required. In addition, in the tube of the 1st path, the rate by the side of water can be held comparatively highly by this configuration for the effective use on the front face of heat transfer. In an evaporator, since heat transfer surface area is restricted and the heat exchange engine performance is low, it is not necessary to arrange the 2nd path in a liquefied refrigerant. For this reason, liquid level of a refrigerant can be made low and, therefore, the amount of the refrigerant used of a system can be lessened.
[0011] The purpose of other this inventions clarified at these and the following is attained by this invention.
[0012] Fundamentally, a 2 way type heat exchanger can be straight used instead of a formula heat exchanger by having the 2nd path which is the single pipe which mainly functions as a return passage. This heat exchanger can be used for either an evaporator or a condenser.
[0013]
[Embodiment of the Invention] A sign 10 shows the whole 2 way type heat exchanger of shell and tube type, i.e., tubing, type among drawing. Although this heat exchanger 10 was illustrated as an evaporator, also in a condenser, that structure is [the heat exchanger] the same only by connection of passage differing. A heat exchanger 10 has the approximately cylindrical shell 12 which had the edge members 13 and 14 in both ends, respectively. The edge member 13 demarcates the middle water can 20 with a tube seat 15. The edge member 14 demarcates the inlet-port water can 21 and the outlet water can 22 on a tube seat 16 and the batch plate 18, respectively. A heat exchanger 10 has the 1st path heat exchanger in which the inlet-port water can 21 to the water can 20 extends, and contains the heat transfer tube 30 of two or more minor diameters. Generally, the interior and/or exterior are high-performance-ized so that a tube 30 may raise heat exchange effectiveness. The 2nd path heat exchanger of a heat exchanger 10 is the pipe or tube 40 of a big path with which the middle water can 20 to the outlet water can 22 extends.
[0014] A tube 30 and a pipe 40 are arranged at the approximately cylindrical chamber 50 demarcated with shell 12 and tube seats 15 and 16. As illustrated, in case a chamber 50 operates as an evaporator, it receives the liquefied refrigerant 60 from a condenser (not shown) via the port 12-1 used as input. Since a pipe 40 is not related to heat transfer, the liquid level of the liquefied refrigerant 60 does not have the wrap need in a pipe 40 that it must be above a tube 30. The heat transfer area of a pipe 40 is small as compared with the tube 30 whole. In case it operates as a condenser, a port 12-2 serves as input which receives a gas-like refrigerant. A gas-like refrigerant is condensed by exchanging the water and the heat in a tube 30, it is liquefied and a liquefied refrigerant is pulled out via the port 12-1 which functions as a tap hole.
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port 12-1 used as input, and evaporating the liquefied refrigerant 60 there, the liquefied refrigerant 60 takes heat from the water which flows a tube 30, and cools water by this. A gas-like refrigerant is passed from a chamber 50 to the suction of a compressor (not shown) via the port 12-2 used as a tap hole. The water from the cooling circuit of the closed loop of a cooling system (not shown) is supplied to the inlet-port water can 21 from the air conditioning system of a building. And water passes the liquefied refrigerant 60 and the tube 30 which has a heat exchange relation. Evaporating the liquefied refrigerant 60, it takes heat from water and cools water by this. At the 1st path demarcated with the tube 30, it is not concerned nothing but heat transfer by the pipe 40 in which heat transfer has a pipe 40 in the liquefied refrigerant 60 in a line crack and this case is slight.

[0016] The water which passes through the 2nd path demarcated with the pipe 40 goes into the outlet water can 22. It flows into the circuit of the closed loop of the air conditioning system of a building from there for air conditioning.

[0017] When operating as a condenser, a gas-like refrigerant is supplied to a chamber 50, and it is cooled by heat transfer to the water which flows a tube 30 there, and the water which flows a pipe 40 although it is small, and it is condensed (liquefaction). The condensed liquefied refrigerants gather below the location of the bottom of a chamber 50, and the usual tube 30. A liquefied refrigerant is pulled out and supplied to an evaporator (not shown).

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view of the heat exchanger concerning this invention.
[Drawing 2] It is the sectional view which met the line 2-2 of drawing 1 .
[Description of Notations]
10 -- 2 way type heat exchanger
13 -- Edge member
14 -- Edge member
15 -- Tube seat
16 -- Tube seat
18 -- Batch plate
21 -- Inlet-port water can
22 -- Outlet water can
30 -- Heat transfer tube
40 -- Pipe
50 -- Chamber
60 -- Liquefied refrigerant

[Translation done.]

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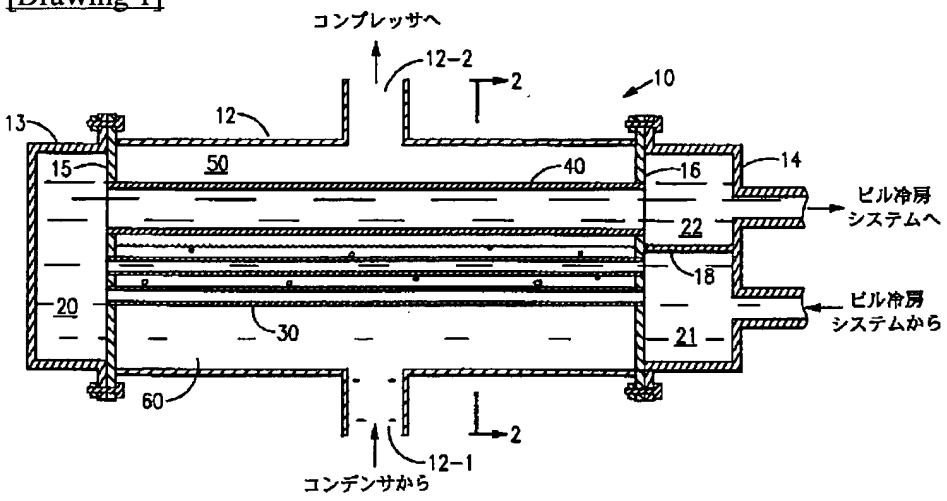
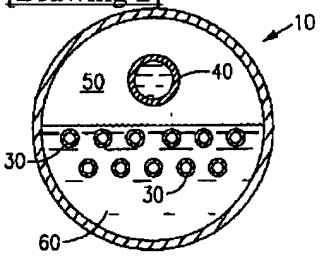
DRAWINGS

[Drawing 1]



[Drawing 2]



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